

REMARKS

This is intended as a full and complete response to the Office Action dated March 6, 2008, having a shortened statutory period for response set to expire on June 6, 2008. Please reconsider the claims pending in the application for reasons discussed below.

Claims 23-48 remain pending in the application and are shown above. Claims 23-48 are rejected by the Examiner. Reconsideration of the rejected claims is requested for reasons presented below.

Claim Rejections - 35 U.S.C. § 103

Claims 23 and 36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hamelin et al.* (U.S. Publ. No. 2006/0134919) in view of *Cain et al.* (U.S. Patent No. 5,439,524) and *Chinn et al.* (U.S. Publ. No. 2003/012848). Applicant respectfully traverses the rejection.

Regarding claims 23 and 26, the Examiner asserts that *Hamelin et al.* teach all of the elements and limitations except a plasma deposition chamber with an RF power source coupled to the diffuser plate, the plasma deposition chamber coupled to a remote plasma source, and the remote plasma source coupled to a fluorine source. The Examiner states that *Cain et al.* teach a plasma processing apparatus with an RF power source coupled to the diffuser plate. The Examiner asserts that it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide an RF source to the diffuser plate in *Hamelin et al.* as taught by *Cain et al.* in order to optimize the chemical treatment chamber of *Hamelin et al.* for producing plasma in the apparatus of *Hamelin et al.* as taught by *Cain et al.* The Examiner further states that *Chinn et al.* teach a fluorine source coupled to a remote plasma generator, which is coupled to the processing chamber. The Examiner further asserts that it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a remote plasma generator coupled to a fluorine source and to the chemical treatment chamber of *Hamelin et al.* and *Cain et al.* as taught by *Chinn et al.*

Applicant respectfully submits that the Examiner errs in these assertions.

Hamelin et al. teach a showerhead for separately introducing HF and NH₃ into a chemical treatment chamber to provide chemical oxide removal for trimming an oxide hard mask. *Hamelin et al.* teach that in order to reduce the feature size formed in a thin film, the oxide hard mask can be trimmed laterally using a two-step process involving a chemical treatment of the exposed surfaces of the hard mask layer, in the chemical treatment chamber, in order to alter the surface chemistry of the hard mask layer and a post treatment of the exposed surfaces of the hard mask layer in order to desorb the altered surface chemistry. The Examiner asserts that the motivation for providing an RF source connected to the showerhead in *Hamelin et al.* is to optimize the chemical treatment chamber of *Hamelin et al.* for producing plasma in the chemical treatment chamber of *Hamelin et al.* as taught by *Cain et al.* The Examiner further asserts that the motivation for providing a remote plasma generator coupled to a fluorine source and to the chemical treatment chamber in *Hamelin et al.* is to provide fluorine radicals for etching and cleaning purposes as taught by *Chinn et al.* However, the Examiner's proposed combination would render *Hamelin et al.* unsatisfactory for its intended purpose because producing a plasma in the chemical treatment chamber of *Hamelin et al.* would be counter to the intended chemical oxide removal process taught by *Hamelin et al.*

Therefore, *Hamelin et al.*, *Cain et al.*, and *Chinn et al.*, alone or in combination, do not teach, show, or suggest a gas distribution plate assembly for a plasma deposition chamber comprising a diffuser plate having an upstream side and a downstream side in the plasma deposition chamber, a plurality of gas passages passing between the upstream and downstream sides, wherein at least one of the gas passages has a first cylindrical shape for a portion of its length extending from the upstream side, a second coaxial cylindrical shape with a smaller diameter connected to the first cylindrical shape and extending for a portion of its length, a coaxial conical shape connected to the second cylindrical shape for the length of the remaining portion of the diffuser plate, with the upstream end of the conical shape having substantially the same diameter as the second cylindrical shape and the downstream end of the conical shape having a larger diameter, and an RF power source coupled to the diffuser plate as recited in claim 23 and claims 24-35 dependent thereon. Applicant requests withdrawal of these rejections.

Likewise, *Hamelin et al.*, *Cain et al.*, and *Chinn et al.*, alone or in combination, do not teach, show, or suggest a gas distribution plate assembly for a plasma deposition chamber comprising a diffuser plate having an upstream side and a downstream side in the plasma deposition chamber that is coupled to a remote plasma source and the remote plasma source is coupled to a fluorine source, a plurality of gas passages passing between the upstream and downstream sides, wherein at least one of the gas passages has a first cylindrical shape for a first portion of its length extending from the upstream side, a second coaxial cylindrical shape with a smaller diameter connected to the first cylindrical shape and extending for a second portion of its length, a coaxial conical shape connected to the second cylindrical shape for the length of the remaining portion of the diffuser plate, with the upstream end of the conical shape having substantially the same diameter as the second cylindrical shape and the downstream end of the conical shape having a larger diameter, and an RF power source coupled to the diffuser plate as recited in claim 36 and claims 37-48 dependent thereon. Applicant requests withdrawal of these rejections.

Claims 24-31, 33, 35, 37-44, 46 and 48 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hamelin et al.* (U.S. Publ. No. 2006/0134919) in view of *Cain et al.* (U.S. Patent No. 5,439,524) and *Chinn et al.* (U.S. Publ. No. 2003/0124848) as discussed in claims 23 and 36 above and further in view of *Metzner et al.* (U.S. Patent No. 6,454,860). Applicant respectfully traverses the rejection.

The deficiencies of *Hamelin et al.*, *Cain et al.*, and *Chinn et al.* are discussed above with respect to base claims 23 and 36. The addition of *Metzner et al.* do not remedy these deficiencies. Therefore, Applicant requests withdrawal of these rejections.

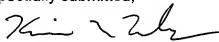
Claims 32 and 34 are ejected under 35 U.S.C. § 103(a) as being unpatentable over *Hamelin et al.* (U.S. Publ. No. 2006/0134919) in view of *Cain et al.* (U.S. Patent No. 5,439,524) and *Chinn et al.* (U.S. Publ. No. 2003/0124848) and *Metzner et al.* (U.S. Patent No. 6,454,860) as discussed in claims 24-31, 33, 35, 37-44, 46 and 48 above and further in view of *White et al.* (U.S. Publ. No. 2003/0066607).

The deficiencies of *Hamelin et al.*, *Cain et al.*, and *Chinn et al.* are discussed above with respect to bas claims 23 and 36. The addition of *Metzner et al.* and *White et al.* do not remedy these deficiencies. Therefore, Applicant requests withdrawal of these rejections.

The secondary references made of record are noted. However, it is believed that the secondary references are no more pertinent to the Applicant's disclosure than the primary references cited in the office action. Therefore, Applicant believes that a detailed discussion of the secondary references is not necessary for a full and complete response to this Final Office Action.

Having addressed all issues set out in the Final Office Action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,

By 

Keith M. Tackett
Registration No.: 32,008
PATTERSON & SHERIDAN, LLP
3040 Post Oak Blvd, Suite 1500
Houston, Texas 77056
Telephone: (713) 623-4844
Facsimile: (713) 623-4846
Attorney For Applicant